

ELECTROSTATIC DISSIPATION

TECHNICAL FIELD

[0001] This invention relates to apparatus and methods for prevention of accidental fires at fueling stations and more particularly to safely dissipating the static electricity of the person performing a fueling operation so as to prevent occurrence of a spark initiated ignition of gasoline fumes present during the fueling operation.

BACKGROUND OF THE INVENTION

[0002] Accidental fires at fueling stations have been ignited by the static discharge from the person performing the fueling operation. The desirability of safely dissipating static electricity in the vicinity of fuel pumps has been recognized as evidenced by U.S. Patent Number 6,401,767 issued June 11, 2002 to J.P. Cohen et al for Apparatus and Method for Grounding Compressed Fuel Fueling Operator wherein the nozzle is locked in the fuel tank until the operator activates a grounding switch. U.S. Patent Number 5,186,357 issued February 16, 1993 to R.C. Foster for a Fuel Dispensing System Having A Flexible Hose with a Static Dissipater and a Fuel Leak Detector provides apparatus for detecting leakage between an underground storage tank and a fuel pump together with apparatus for dissipating static from the pump to the underground fuel tank. This last mentioned U.S. patent also discloses apparatus for dissipating the static electricity from the fuel pump hose used to fill the gas tank of an automotive vehicle.

BRIEF SUMMARY OF THE INVENTION

[0003] In one embodiment of the invention, a method and apparatus are provided for dissipating the electrostatic condition of a person fueling a vehicle from a gas pump. A static discharge sign at the gas pump includes a grounded touch area with instructions for discharging personal static.

[0004] In a second embodiment of the invention a motion detector is provided at the pump to detect a person approaching the pump to engage in a fueling operation. The motion detector activates a recorded message module which includes a speaker. Upon detecting the presence of a person the message module automatically causes the recorded message to be issued through the speaker telling the fueling person to place his or her hand on the static discharge sign which is located on or adjacent the fuel pump. The static discharge sign includes a touch sensor which, when touched, operates a switch in the fuel pump control circuit to permit it to run, provided the normal fueling steps have been taken i.e. payment, gasoline type selection and operation of the fueling nozzle.

[0005] In a third embodiment of the invention, static discharge pads or signs are placed on the inside and/or outside of the driver's side door of a vehicle to facilitate personal static discharge as the driver leaves the vehicle.

[0006] It is a primary object of the invention to reduce the fire hazard attendant the fueling of a vehicle. It is a further object of the invention to provide a fueling station where the person obtaining fuel must first discharge personal static electricity. It is also an object of the invention to provide static discharge pads on a vehicle facilitating safe discharge of personal static electricity when the driver leaves the vehicle. In all versions of the invention the touch pads are made of a material providing a sufficiently slow discharge of personal static electricity to avoid a spark when touched.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The invention is illustrated in the accompanying drawings, in which:

Figure 1 shows a fuel pump with a static discharge sign having a touch area for discharging personal static;

Figure 2 is an enlarged view of the sign shown in Figure 1;

Figure 3 is an alternate sign to that shown in Figure 2, which in addition to the static discharge touch area, includes a touch sensor, motion detector and speaker;

Figure 4 shows a control system associated with the components of the fuel delivery and safety system of this invention.

Figure 5 shows a static discharge pad on the outside of the driver's side door of a vehicle;

Figure 6 is a pictorial view showing a static discharge pad on the inside of the driver's side door of a vehicle; and

Figure 7 is an enlarged view of the static discharge pad applied to the inside and outside of the door as shown in Figures 5 and 6.

DETAILED DESCRIPTION OF THE INVENTION

[0008] Referring to Figure 1, the fueling station or module 11 includes a fuel pump 12 driven by an elective motor 13. An inlet hose 14 is connected to an underground storage tank, not shown and an outlet hose 16 is connected to a delivery hose 17 having an appropriate nozzle 18 on its end. The fueling module 11 has the usual visual indicator panel 21 showing total sales and gallons delivered by the fueling module 11, a credit card payment device 22 and manually operated fuel grade selection pads 23, 24, 26. In order to improve the safety of the fueling operation, a caution sign or panel 31 is attached to the fueling module 11 which not only includes safety instructions concerning fueling but also includes a hand print marked area or touch area 32 which is grounded to effect a controlled, non-spark discharge of the electro-static charge of the individual touching the area 32. The touch area 32 or the entire panel 31 is made of a material providing sufficiently slow discharge of electrostatic electricity to avoid an electrical spark. Preferably the resistance of the touch area material is between 10^6 and 10^{11} ohms. Thus a

convenient static discharge structure is provided at or adjacent the pump module 11 to minimize possible ignition of gas fumes at a fueling station.

[0009] Figure 2 is an enlarged view of the caution panel 31 shown in Figure 1. It includes instructions for discharging individual static, what to do in case of fire and refueling safety rules.

[0010] Figures 3 and 4 illustrate a safety system having control apparatus preventing fuel delivery if the customer does not discharge his or her static electricity. Also included is apparatus for alerting the attendant to the presence of a customer and advising whether or not the customer has discharged his or her static electricity. The safety control apparatus includes a panel 41 with instructions concerning discharge of personal static electricity. The panel 41 is on or adjacent the fueling module at a height permitting hand engagement by a standing person. The panel 41 includes a hand engageable area 42 carrying a hand image which is made of a material having a resistance of 10^6 to 10^{11} ohms and is appropriately grounded to discharge individual static electricity without creating a spark. A static discharge touch sensor 43 is positioned at the hand image. The panel also includes a motion detector 46 and a speaker 47.

[0011] The motion detector 46 is connected to a speaker or speaker apparatus 47 by a lead 48 and includes the necessary mechanism for delivering a recorded message from the speaker 47 audible to the person obtaining fuel from the pump module 11. The recorded message advises that fuel cannot be obtained until the customer places his or her hand on the hand image to discharge their static electricity. The motion detector 46 is also connected by a lead 49 to a switch 51 for a signal light 52 in a filling station attendant's cubicle 53. When the motion detector 46 detects the presence of a person, the switch 51 closes to cause the light 52 to go on. When the customer engages the static discharge area 42 the touch sensor 43 sends a signal via a lead 54 to the switch 51 causing the light to go out thereby informing the attendant that the

customer has discharged his or her static electricity. A buzzer could be substituted for the light 52. The touch sensor 43 also delivers a signal via lead 56 to a static discharge or interruption switch 57 in an electric relay lead 58 from a source of electricity, not shown, to a solenoid operated gas pump motor switch 59 in the electric power supply lead 60 to the pump 13. A payment switch 61, a gasoline grade selection switch 62 and a nozzle switch 63 are also interposed in the solenoid power supply lead 58. The switches 57, 61, 62, 63 have a series relationship with one another and they all must be closed in order to run the pump motor 13 to deliver gas to the customer.

[0012] Referring to the embodiment of the invention illustrated in Figure 5, a static discharge pad or sign 81 is secured to the upper rear of the outside panel 82 of the driver's side door 83 of a vehicle 84 near the outside door handle 96. The door 83 is hinged at its front end to the chassis of the vehicle and the pad 81 is placed near the rear unhinged end of the door. Figure 6 shows a static discharge pad 81 secured to the upper rear of an inside panel 92 of the door 83. The discharge pad 81 is between the inside door handle 93 and the rear end of the door 83. Figure 7 shows the static discharge contact area 94 of the pad 81 and a preferred instructive wording for the discharge pad. The discharge pads 81 are grounded to the metal chassis of the vehicle and are made of a material which provides a sufficiently slow discharge of personal static electricity to avoid a spark when touched. Preferably the discharge pads 81 have a resistance of between 10^6 and 10^{11} ohms.

[0013] The static discharge pads 81 are positioned on the door where the vehicle driver customarily places his hand or hands when leaving the vehicle. The static electricity of the driver is discharged in a safe manner, thus increasing the safety of a fueling operation. Static

discharge pads may be placed on all the doors of the vehicle to insure static discharge of any passenger leaving the vehicle to perform a fueling operation.